

REMARKS

Claims 48-74 were pending in this application. Claims 48-55, 60-72 and 74 have been rejected and claims 56-59 and 73 objected to. Claims 56-59 and 73 have been canceled and new claims 75-79 have been added by this Amendment. Claims 48-55, 60-72, and 74-79 are currently pending. Applicants note that the cover page of the Office Action states that claims 48-55, 64-72 and 74 are rejected, however based on the body of the Office Action, Applicants believe this was intended to state that claims 48-55, 60-72, and 74 were rejected; and Applicants have responded herein accordingly.

Drawings

The Office Action objects to the drawings because figures and reference numbers are hand written. Applicants have submitted formal drawings concurrently herewith and request that this objection be withdrawn.

The Office Action further objects to FIG. 3 and FIG. 3a on the grounds that they fail to comply with 37 CFR 1.84(p)(4) because reference characters 20, 21, 50 13, and 12 in Fig. 3, and reference characters 20, 21, and 32 in Fig. 3a all have been used to designate the same elements. Applicants disagree.

37 CFR 1.84(p)(4) states:

“The same part of an invention appearing in more than one view of the drawing must always be designated by the same reference character, and the same reference character must never be used to designate different parts.”

Applicants respectfully submit that as explained at length in the November 23, 2005 Amendment in Response to Office Action, each of these references is explained in the specification, and the drawings comply with 37 CFR 1.84(p)(4). As described at paragraph [00074] of the specification, in Figs. 3 and 3a, reference element 20 refers to

“supports.” The supports can be located at one or more designated areas of the device. (*Id.*) As further explained in the specification, an embodiment of the supports 20 is posts 50. (*Id.*) An alternative embodiment of supports 20 is a support wall 32. (*Id.*) The specification makes clear that element 21 designates the “edge” of the device (*id.* at paragraph [00075]), and that element 12 designates a second micro lens array comprised of one or more second micro-lenses 13 (*id.* at paragraph [00065]). Applicants submit that the specification makes clear that elements 32 and 50 represent alternative embodiments of element 20, and further that elements 12, 13 and 21 do not designate the same elements as element 20 (or the alternate embodiments referenced by elements 32 and 50). The Office Action provides no explanation (or other basis) from which to conclude that the drawings do not comply with 37 CFR 1.84(p)(4) and Applicants requests the objection be withdrawn.

Claim Rejections 35 USC § 102

The Office Action rejects claims 48-55, 60-61, 64-72 and 74 under 35 USC § 102(b) as being anticipated by Fukusyo. When describing Fukusyo, the Office Action (at pp. 9-10) argues that Fukusyo discloses: “... applying a sacrificial material (24, i.e., lens layer) to the upper substrate layer” (at col. 4, lines 42-46 and FIG. 2B of Fukusyo); “...forming support molds (combination of light shielding film (10) and insulating film (9), overcoat layer (21) in the sacrificial material” (at col. 4, lines 4-8 and 48-51 of Fukusyo); “... forming lens molds (22, i.e., recessed portion) in the sacrificial material” (at col. 5, lines 23-27 and Fig. 2A of Fukusyo); “... forming supports (transfer electrode (8)) by filling the support molds (contour of the surface of the light shielding film (10) and insulating film (9) with support material (21, i.e., overcoat layer” (at col. 5, lines 8-12 and FIG. 2B of Fukusyo); “... forming a first micro-lens array having first micro-lenses by filling the lens molds (22, i.e., recessed portion) with first micro-lens material

(23, i.e., lens portion)”; and “removing the sacrificial material (24, i.e., lens layer)” (at col. 5, lines 38-32 and Fig. 2C of Fukusyo). As explained in more detail below, Fukusyo does not disclose the subject matter of claims 48-55, 60-61, 64-72 and 74.

35 USC § 102(b) Rejection of Independent Claim 48 and Dependent Claims 49-55, 60-61 Based on Fukusyo

Fukusyo does not disclose the method of claim 48 comprising: “providing a substrate comprising a plurality of photosensitive regions having photo sensors, and an upper substrate layer; providing a color filter array on top of the upper substrate layer; applying a sacrificial material to the upper substrate layer; forming support molds in the sacrificial material; forming lens molds in the sacrificial material; forming supports by filling the support molds with a support material; forming a first micro-lens array having first micro-lenses by filling the lens molds with a first micro-lens material; and removing the sacrificial material.”

In fact, the disclosure relied on in the Office Action undermines the conclusion drawn therein. For example, the Office Action argues that the “combination of light shielding film (10) and insulating film (9), overcoat layer (21) in the sacrificial material” anticipates the step of forming support molds in the sacrificial material. As shown in Fukusyo FIGs. 2A and 2B, however, elements 10, 9, and 21 are formed prior to application of the lens layer 24 (which the Office Action argues is the sacrificial material). Even assuming that the lens layer 24 disclosed the sacrificial material of claim 48 (which it does not), elements 10, 9 and 21 of Fukusyo cannot disclose forming supports molds in sacrificial material because elements 10, 9, and 21 are shown as existing before the lens layer 24 (i.e., alleged sacrificial material) is even applied. Fukusyo fails to disclose either the sacrificial material, the support molds or the step of forming support molds in the sacrificial material of claim 48.

Furthermore, the Office Action argues “forming supports” is shown in Fukusyo by transfer electrode (8) and by filing the support molds (contour of the surface of the light shielding film (10) and insulating film (9) with support material (21, i.e., overcoat layer” (citing Fukusyo col. 5, lines 8-12 and FIG. 2B). Thus, the Office Action is arguing that support molds are shown by elements 10, 9 and 21 and that supports are formed by filling in the support molds with support material 21. The Office Action essentially states that supports are created by filling in support molds with support material 21; however, according to the Office Action, support material 21 is used to create the support molds in the first place. Applicants respectfully submit that the Office Action provides no basis (or other explanation) under which such analysis could reasonably apply.

Similarly, there is no disclosure in Fukusyo of “forming lens molds in the sacrificial material” as claimed in the present invention and FIG. 2A, which is cited by the Office Action as disclosing this step, actually undermines the Office Action’s arguments. Specifically, FIG. 2A shows recessed portion 22 (relied on in the Office Action as disclosing the claimed lens molds), but the lens layer 24 that the Office Action alleges anticipates the claimed sacrificial material is not applied until FIG. 2B. Thus, contrary to the arguments of the Office Action, Fukusyo simply does not disclose forming lens molds in the sacrificial material. The text at col. 5, lines 23-27 of Fukusyo (cited at p. 10 of the Office Action) reinforces rather than remedies the failure of FIGs. 2A and 2B. The cited text discloses that SiN film is deposited to form lens layer 24 and is securely embedded in the recessed portion 22. To the extent Fukusyo discloses anything, it is applying a lens layer to preformed recesses.

Applicants further note that the Office Action cites five lines (col. 5, lines 2-7) of Fukusyo as disclosing a plethora of elements, including: applying a sacrificial

material to the upper substrate layer (Office Action at p. 4 (directed to claim 48)); removing a sacrificial material (id. (directed to claim 48)); applying a sacrificial photo resist to the sacrificial material (col. 5, lines 2-7) (id. (directed to claim 49)); applying a mask to the sacrificial photo resist and exposing support opening in the sacrificial photo resist (id. (directed to claim 49)); etching by applying a chemical etching solution to form support by etching through support openings (id. (directed to claim 49)); chemical etching as an anisotropic etching solution (id. (directed to claim 50)); apply a sacrificial photo resist to the sacrificial material (id. (directed to claim 51)); applying a mask to the sacrificial photo resist and exposing sacrificial resist openings in the sacrificial photo resist (id. (directed to claim 51)); applying a rinse to stop the etching process (that was applied to the sacrificial material) (id. (directed to claim 51)) applying a rinse to stop the etching process (id. at p. 5 (directed to claim 51)); chemical etching solution as an isotropic etching solution (id. (directed to claim 52)); etching support molds in the sacrificial material by controlled laser etching (id. (directed to claim 53)); etching lens molds in the sacrificial material by controlled laser etching (id. (directed to claim 54)); and heating the sacrificial material to at least the degradation point (id. (directed to claim 55)); treating the sacrificial material with chemical resist solvents (id. (directed to claim 60)).

Applicants respectfully submit that the Column 5, lines 2-7 of Fukusyo merely states "[t]hen, an insulation film 7, a transfer electrode 8, and interlayer insulation film 9, and a light shielding film 10 are formed on the above mentioned parts by related art techniques including photoresist formation, ion implantation, thermal oxidation, deposition, lithography and etching." The Office Action has not provided any basis for the conclusions drawn therein in support of the cites to col. 5, lines 2-7 against the above-listed claims. Column 5, lines 2-7 of Fukusyo is expressly directed to forming elements 8, 9, and 10, and discloses these elements are formed prior

application of the lens layer (which the Office Action alleges anticipates the sacrificial material disclosure of claim 48). The Office Action has set forth no explanation of how a disclosure of steps performed before application of the lens layer (alleged to disclose the sacrificial material) could anticipate the above referenced-claims of the present invention.

As described above, Fukusyo does not disclose claim 48 or its dependent claims. Applicants request the rejection of claim 48 (and its dependent claims 49-55 and 60-61) be withdrawn.

35 USC § 102(b) Rejection of Independent Claim 64 and Dependent Claims 65-72, and 74 Based on Fukusyo

Fukusyo does not disclose the method of claim 64 comprising: providing a substrate comprising a plurality of photosensitive regions having photo sensors, and an upper substrate layer; applying a sacrificial material above the upper substrate layer; forming lens molds in the sacrificial material; forming a micro-lens array having micro-lenses by filling the lens molds with a micro-lens material; and removing the sacrificial material.

Fukusyo fails disclose steps of claim 64 for the same reasons stated above regarding claim 48 (e.g., with respect to applying a sacrificial material...; forming lens molds in the sacrificial material; forming ... a micro-lens array...by filling the lens molds...; and removing the sacrificial material).

Additionally, Fukusyo fails to disclose dependent claim 65 (and its dependent claims 66-67, 72, 74) for the same reasons stated above regarding both claim 64 (from which claim 65 depends) and claim 48 (e.g., with respect to forming support molds and forming supports).

Fukusyo fails to disclose dependent claims 68-71 for the same reasons stated above regarding claim 64 from which they depend.

Additionally, Fukusyo col. 5, lines 2-7 is cited against claim 64 and its dependant claims 65-72 (Office Action at pp. 5-7), but fails to anticipate these claims for the reasons analogous to those set forth above with respect to claims 48-55 and 60. Applicants request the rejection of claim 64 (and its dependent claims 65-72 and 74) be withdrawn.

35 USC § 102(b) Rejection of Independent Claim 62 and Dependent Claims 63, and 74 Based on Burger

Fig. 2 of Burger, which the Office Action relies on, discloses multiple, stacked substrates having an opto-mechanical fixturing 58 or spacing elements 68 separating multiple substrates. (Burger col. 20 line 26 – col. 21 line 50.) Burger discloses the micro-lens arrays are within, and supported by, their corresponding substrates. Burger fails to disclose or suggest the subject matter of claims 62 and 63. In particular, Burger fails to anticipate the combination of independent claim 62 including, *inter alia*, “providing a substrate having a plurality of photo sensors; forming one or more supports having distal and proximal ends wherein the distal ends are proximate the substrate; and forming a first micro-lens array in association with the substrate, the first micro-lens array having micro-lenses corresponding to said photo sensors and supported by the supports at said proximal ends wherein a cavity is formed between said first micro-lens array and said substrate.” Although Burger discloses separation between the stacked *substrates*, Burger fails to disclose or suggest the limitations of claims 62 and 63. The Office Action fails to cite or explain any disclosure in Burger (Fig. 2 or otherwise) that discloses the present invention. For example, the Office Action fails to cite any disclosure in Burger of a cavity between a substrate and its corresponding micro-lens.

There is no such disclosure in Burger – FIG. 2 of Burger merely shows substrates (with corresponding lenses) that are spatially separated from other substrates (with corresponding lenses). Such disclosure does not anticipate claims 62 or 63 and the Office Action has not set forth any basis to conclude otherwise. Applicants request that the rejections of claims 62 and 63 be withdrawn.

Allowable Subject Matter

The Office Action has objected to claims 56-59 and 73, and states that if written in independent form these claims would be allowable. Claims 56-59 and 73 have been canceled; new claim 75 is original claim 56 written in independent form, new claims 76-78 (depend from new claim 75) and correspond to original claims 57-59, and new claim 79 is previously presented 73 written in independent form. Applicant submits that claims 75-79 are in condition for allowance.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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